Quercus imbricaria has been recorded from Bridgeton, N. J. by Lesquereux[8] from beds which I consider as probably Pleistocene in age, although they have usually been considered somewhat older. In the recent flora it ranges from Pennsylvania to Michigan and Arkansas, Georgia and Tennessee.

[8] LESQUEREUX, L. U. S. Nat. Mus. Proc. 10: 39. 1887.

ZOOLOGY.—*New experimental hosts for* Brachylaemus virginiana (*Dickerson*) *Krull.*[1] WENDELL H. KRULL, Bureau of Animal Industry.

The white rat, dog, cat, and chicken have been infected experimentally with *Brachylaemus virginiana,* a fluke normally parasitic in the opossum, *Didelphis virginiana,* and mature flukes have been recovered from these hosts. Eggs of *B. virginiana* collected from the feces of one of the experimentally infected dogs were used to infect the normal first intermediate host, *Polygyra thyroides.* Consequently, it is assumed that some, at least, of the new hosts are potentially capable of disseminating the parasite in regions where the opossum and its snail host are found.

The metacercariae of *B. virginiana* used in the following infection experiments were obtained from laboratory raised and infected snails, *P. thyroides;* an extensive account of these infection experiments is being given by the writer in a paper now in press. Every snail used in the subsequent experiment contained hundreds of metacercariae, all of which were 7 months old.

Two puppies, litter mates, were used in the present experiment. A puppy 5 weeks old was given approximately 200 metacercariae, and when it was killed, 7 days later, 111 mature specimens of *Brachylaemus virginiana,* 2.05 to 2.60 mm. long when stained and mounted, were recovered from the intestine. The uterus in each of these flukes was extensive and filled with apparently normal, brown colored eggs. The second puppy, when 6 weeks old, was given approximately 400 metacercariae. Eggs were recovered in the feces of the dog 12 days after the metacercariae were administered; eggs were quite common in the feces a day later, abundant 5 days after that, and fewer in number 9 days later, or 27 days after the dog was infected. Since there was an apparent decrease in the number of eggs it was suspected that the infection was being lost; however, when the animal was killed 349 flukes were recovered. These were large and equal in size to any

[1] Received August 24, 1934.

recovered from an opossum. The trematodes were localized in a comparatively small area in the posterior part of the small intestine. They were very conspicuous because of the numerous dark colored eggs in the extensive uterus which occupies the greater part of the intercecal field. On 3 previous occasions metacercariae of *B. virginiana* have been given to adult dogs and no infections ever developed, and, while not enough dogs were used for the results to be significant, the experiment indicates that adult dogs apparently are not easily infected.

Eggs of *Brachylaemus virginiana* from the feces of the second puppy in the present experiment were used to infect the normal first intermediate host, *Polygyra thyroides*. Four snails were subjected to infection, and 2 of them became infested.

Two kittens, litter mates, were used in infection experiments. A suckling kitten, 2 weeks old, was given approximately 100 metacercariae and when it was examined postmortem, 7 days later, 74 mature flukes, 1.95 to 2.25 mm. long when stained and mounted, were recovered. The uterus in each fluke was extensive and filled with normal brown colored eggs. A second kitten, 3 weeks old, was given about 200 metacercariae, and eggs of the fluke appeared in the feces 14 days later. Eggs were common in the feces of the host 3 days later, and fewer after 10 more days, or 27 days subsequent to the time the animal was subjected to infection. The kitten was weaned while it was infested and when examined postmortem, 27 days after receiving the metacercariae, 50 adult flukes were recovered; they were in the posterior part of the small intestine, as in the case of the dog.

Two chicks were used in infection experiments; these were less than 24 hours old when subjected to infection. One chick was given 50 metacercariae, and when destroyed, 2 days later, 5 immature flukes were recovered from the posterior part of the small intestine. These flukes had grown considerably and had attained adult shape. The other chick received 75 metacercariae and 5 days later 6 mature flukes, 1.95 to 2.35 mm. long when stained and mounted, were recovered postmortem from the intestine. All flukes had normal colored eggs in the terminal part of the descending branch of the uterus.

On previous occasions attempts to infect 4 chickens with *B. virginiana* had been unsuccessful. These chickens were fully feathered at the time they were subjected to infection. Since the cause of the failure to infect these chickens is not known, and since the diet may have had something to do with the negative results, it should be stated that these chickens were fed on grain, while the chicks which

became infested in the present experiment were given bits of raw beef.

A small rat, which had just been weaned, was given 75 metacercariae, and when examined, 3 days later, 2 mature flukes, each containing a couple of eggs were recovered from the small intestine. A second rat, fully grown, received approximately 100 metacercariae, and when killed 4 days later, 5 mature flukes were recovered postmortem from the small intestine. The flukes from this rat contained numerous normally colored eggs.

Previously it was found by the writer that *Brachylaemus virginiana* would live in the white rat only 3 days. In view of the small number of parasites recovered from the rats in the present experiment, in spite of the comparatively large numbers of metacercariae which were administered, it is suspected that previous failure to obtain adult flukes in white rats resulted from using too few metacercariae in attempts to infect them.

SUMMARY AND CONCLUSIONS

The experiment shows that the dog, cat, chicken, and white rat may serve as definitive hosts of *Brachylaemus virginiana* of which the opossum is the natural definitive host. It is apparent from the data presented that there may be a difference in the rate of maturity and growth after maturity of the flukes in the different hosts. More data, however, are necessary to verify this point. A comparison of flukes of the same age from a kitten and a puppy, however, showed a striking difference in size, the flukes in the puppy being larger than those in the kitten. Young dogs and cats become infected easily, and practically all of the metacercariae establish themselves, which fact is not apparent in the case of chickens and rats.

The results of these experiments suggest that some of the described species in this genus, which are morphologically similar, are not good species, but have been recognized as valid largely because of host relationship. It is also apparent that, since *B. virginiana* has been established in several hosts, it may be a suitable trematode with which experiments relative to age resistance, longevity, and the relation of the fluke to food habits of the host may be undertaken.